ATTO ExpressSAS Troubleshooting Guide for Linux

This document describes troubleshooting techniques that can be used to identify and resolve issues associated with the ATTO ExpressSAS Raid Controller. Some of these techniques may seem simplistic or overly obvious, but these are the ones that are commonly overlooked and can take several hours of frustration to find. It is important to only try one technique at a time. While changing multiple variables may seem to be a time saver, it usually complicates the troubleshooting process.

A.) Linux Operating Systems

→ The controller driver was loaded properly and everything was working, but the devices do not show up after the computer was rebooted. On some Red Hat Linux distributions, the driver may not automatically load when the system is booted.

- To enable driver autoload in Red Hat Enterprise Linux 4 Add the following line to **/etc/modprobe.conf** after installing the driver:
  alias scsi_hostadapterX esasraid Where X is the next available #.

  To enable driver autoload in Red Hat Enterprise Linux 3 Add the following line to **/etc/rc.modules** after installing the driver:

  modprobe esasraid

  (Note: you may need to create /etc/rc.modules and make it executable with 'chmod +x /etc/rc.modules')

→ On certain 64-bit platforms, the driver Makefile may be unable to detect the correct CPU architecture. When compiling the driver, an error such as *"cc1 : error : CPU you selected does not support x86_64 instruction set"*.

- This can be resolved by specifying the correct architecture when running the make command. For example: **$make install ARCH=x86_64**

→ The connected SAS devices aren't detected by the operating system.

- Verify the driver is loaded by examining the output of the **lsmod** command for "esasraid".
- Check **/proc/scsi/scsi** to see a list of devices that are known by the operating system. This will only list the device at LUN 0 and it's negotiated speed.
- Verify the drives are mapped to the controller correctly. You may need to execute the 'automap' command to remap the drives. This can be done in the ATTO Configuration Tool or the controller utilities (CTRL-Z).

- If there is an Expander in the Array verify the following:
  - **Zoning**: Verify the Expander(s) are zoned properly so that the ExpressSAS Raid card and the SAS/SATA drives have access to one another. If there are pre-existing zones setup, be sure to add the ExpressSAS Raid to the zone.
  - **Port Visibility**: Verify the Expander can see the ExpressSAS Raid card on the port(s) in question. Refer to the Expanders manufacturer's guide for more detail on this step.
  - **Speed Auto negotiation**: Verify the Expander is set to "Auto" negotiate transfer speed.

→ The ExpressSAS RAID controller is recognized, but it does not detect <u>any</u> of the connected SAS devices. The command *dmesg* can be used to see what devices are detected when the driver loads. It will list each device per SAS port.

- Verify the SAS devices are powered on.
- Verify the drives are mapped to the controller correctly. You may need to execute the 'automap' command to remap the drives. This can be done in the ATTO Configuration Tool or the controller utilities (CTRL-Z).
- Check cable integrity. Check the cables for solid connections. Make sure they are snapped in. Inspect cable ends for physical damage.
- Try attaching SAS devices one at a time with different cables, adding drives and cables until the problem occurs. This will help pinpoint the device or cable causing the problem.
- Watch the LED indicators on the SAS devices before, during, and after startup. Drive lights should also flash at startup as the SAS bus is scanned. This may give a clue as to the root cause of the issue.
- Try putting the controller in a different PCI slot.
- Try updating the firmware on the controller as described in the "Installation and Operations" manual.
- If there is an Expander in the Array verify the following:
  - **Zoning**: Verify the Expander(s) are zoned properly so that the ExpressSAS Raidcard and the SAS/SATA drives have access to one another. If there are pre-existing zones setup, be sure to add the ExpressSAS Raid to the zone.
  - **Port Visibility**: Verify the Expander can see the ExpressSAS Raid card on the port(s) in question. Refer to the Expanders manufacturer's guide for more detail on this step.
  - **Speed Auto negotiation**: Verify the Expander is set to "Auto" negotiate transfer speed.
- If all else fails, replace the SAS controller.

→ The computer recognizes the EXPRESSSAS RAID controller, but <u>only detects</u> connected SAS devices on <u>one</u> of the busses. The other bus reports no devices. The command *dmesg* can be used to see what devices are detected on each SAS bus.

Note: I you are using a R348 SAS Controller be sure the controller is configured to use the appropriate ports you need. This card can be configured to use all internal connectors or one internal and one external.

- Swap the devices and cables from the SAS bus that appears to be working with the one having issues. If the issue follows the bus and there is an expander in the Array, move on to next step. If there is no expander, replace the card.
- If there is an Expander in the Array verify the following:
  - **Zoning**: Verify the Expander(s) are zoned properly so that the ExpressSAS Raid card and the SAS/SATA drives have access to one another. If there are pre-existing zones setup, be sure to add the ExpressSAS Raid to the zone.

If the issue follows the attached SAS devices, troubleshoot the attached devices:

- Verify the SAS devices are powered on.
- Verify the drives are mapped to the controller correctly. You may need to execute the 'automap' command to remap the drives. This can be done in the ATTO Configuration Tool or the controller utilities (CTRL-Z).
- Check cable integrity. Check the cables for solid connections. Make sure they are snapped in. Inspect cable ends for physical damage.
- Try attaching SAS devices one at a time with different cables, adding drives and cables until the problem occurs. This will help pinpoint the device or cable causing the problem.
- Watch the LED indicators on the SAS devices before, during, and after startup. Drive lights should also flash at startup as the SAS bus is scanned. This may give a clue as to the root cause of the issue.

→ The ExpressSAS RAID controller is detected by the operating system, it <u>detects some</u> of the connected devices on the SAS ports, but <u>does not detect all</u> of the connected devices. The command *dmesg* can be used to see what devices are detected on each SAS bus.

- Verify the SAS devices are powered on.
- Verify the drives are mapped to the controller correctly. You may need to execute the 'automap' command to remap the drives. This can be done in the ATTO Configuration Tool or the controller utilities (CTRL-Z).
- Check cable integrity. Check the cables for solid connections. Make sure they are screwed down. Inspect cable ends for physical damage.
- Try attaching SAS devices one at a time with different cables, adding drives and cables until the problem occurs. This will help pinpoint the device or cable causing the problem.
- Watch the LED indicators on the SAS devices before, during, and after startup. Drive lights should also flash at startup as the SAS bus is scanned. This may give a clue as to the root cause of the issue.
- If there is an Expander in the Array verify the following:

- **Zoning**: Verify the Expander(s) are zoned properly so that the ExpressSAS Raid card and the SAS/SATA drives have access to one another. If there are pre-existing zones setup, be sure to add the ExpressSAS Raid to the zone.
- **Port Visibility**: Verify the Expander can see the ExpressSAS Raid card on the port(s) in question. Refer to the Expanders manufacturer's guide for more detail on this step.
- **Speed Auto negotiation**: Verify the Expander is set to "Auto" negotiate transfer speed.

B.) Error Log Capabilities

The ATTO ExpressSAS Raid driver logs all failure related information to an event log. The user can control the classification of events that are recorded via a command line argument for Linux.

The driver records events broken into the following classifications.

- FATAL Records various fatal situations within the driver and controller.
- SAS Records SAS errors as reported by the controller.
- ISP Records errors as reported by the FW of the controller.
- LOOP Records event notifications as reported by the FW.
- INFO Records events related to the starting and restarting of the driver.

We recommend Event Logging only be active for troubleshooting purposes as performance will be affected. Also, when in this mode of operation, all flags be enabled.

To enable the advanced event logging features of the ATTO ExpressSAS Raid Controller in a ***Linux*** environment please do the following:

- Stop any operations or programs using the esasraid driver such as: mounted drives, Configuration Tool, or attocfg module.
- Remove the driver (**rmmod esasraid**)
- Load the driver with event logging enabled (**modprobe esasraid event_log_mask=0xffffff**)
- The output can be obtained from **dmesg.**

To disable event logging under Linux, simply remove the driver with the event log mask and reload the driver normally.

C.) Escalating issues to Tech Support.

When an error is encountered, please insure you have an answer to each of the following questions when reporting it as an issue:

QUESTION	ANSWERED
1. Computer Model:	
2. Operating System:	
3. OS Patch Level:	
4. PCI slot # and type:	
5. ATTO driver version:	
6. ATTO firmware revision:	
7. List all of the devices attached to the ATTO HBA. Include the manufacturer and model number for each device:	
8. Did it ever work? Is this a new error that just started happening, or is this an error that has been around since the first use.	
9. Does it happen when you try it with a second controller (if possible)? For example, swap out one controller for another and see if error still occurs.	
10. Is the latest firmware and driver being used?	
11. Is the device in default mode? Are there settings that have been adjusted that may be causing the problem? Do settings need to be adjusted to allow the device to function properly?	
12. How duplicable is the error? Does the error occur sporadically/randomly, or can it be reproduced each and every time?	
13. If the system was working previously, what changed about the configuration?	

D.) Helpful Hint

To view a list of user configurable parameters, the driver version, and a list of attached devices by Target ID, type the following commands into a terminal windows:

cat /proc/scsi/scsi

Find the “Host: scsi#” and replace the number “#” found here for the “#” symbol in the next command

cat /proc/scsi/esasraid/#

An example output is as follows:

techsupp1:~ # cat /proc/scsi/scsi
Attached devices:
Host: scsi0 Channel: 00 Id: 00 Lun: 00
  Vendor: ATA Model: WDC WD800JD-75MS Rev: 10.0
  Type: Direct-Access ANSI SCSI revision: 05
Host: scsi**2** Channel: 00 Id: 00 Lun: 00
  Vendor: ATTO Model: NewGroup00 Rev: 0001
  Type: Direct-Access ANSI SCSI revision: 05
Host: scsi2 Channel: 00 Id: 01 Lun: 00
  Vendor: ATTO Model: raid5grp100 Rev: 0001
  Type: Direct-Access ANSI SCSI revision: 05
Host: scsi2 Channel: 00 Id: 02 Lun: 00
  Vendor: ATTO Model: raid0grp000 Rev: 0001
  Type: Direct-Access ANSI SCSI revision: 05

techsupp1:~ # cat /proc/scsi/esasraid/**2**
ATTO ExpressSAS RAID Adapter
Driver version 1.01
Flash version 04/04/2007
Copyright 2001-2007
http://www.attotech.com

Driver Parameters:
---
sgl_page_size=128, event_log_mask=0x00000000, num_sg_lists=1024, num_ioreq=256, cmd_per_lun=32, can_queue=128, sg_tablesize=255, atto_max_sectors=65535, cmd_retry_count=20, change_notification=0

Adapter Information:

Model: ATTO ExpressSAS R380
SAS Address: 50010860:0000014E

Discovered Devices:

```
  #  TargID
------------
  1     0
  2     1
  3     2

Statistics:
-----------
Time elapsed (ms)       : 121640
Commands completed      : 422
Outstanding commands    : 0
Max outstanding commands: 3

techsupp1:~ #
```